11. HPC SPECIFICATIONS

HIGH STRENGTH PRESTRESSED CONCRETE MEMBERS (SPECIAL)

High strength prestressed concrete members shall meet the requirements of Section 1078 of the Standard Specifications, with the following exceptions:

1.0 Materials

The coarse aggregate shall have a Los Angeles abrasion loss of not more than 40 percent and a sodium sulfate soundness loss at five cycles of not more than 8 percent.

Portland cement shall be pretested and come from a single source. Strength uniformity of the cement shall be certified by the manufacturer in accordance with ASTM C917. The certification shall be submitted to the Engineer with the contractor's proposed mix design.

2.0 Portland Cement Concrete Composition and Design

All concrete shall develop the minimum compressive strength shown on the plans at the age of 28 days. Concrete shall be air entrained to provide an air content of 4 percent, plus or minus 1 percent. Concrete shall have a maximum slump of 85 mm before the addition of high range water reducer and 180 mm with high range water reducer. The maximum water-cementitious material ratio shall not exceed 0.40. Fly ash, microsilica, and ground granulated blast furnace slag or their combinations may be used as part of the cementitious material at a rate consistent with industry practice and with the approval of the Engineer. High range water reducer shall be used at a rate not to exceed the manufacturer's recommended dosage.

Mix designs, stated in terms of saturated surface dry weights, shall be submitted on M&T Form 312 at least 90 days prior to using the proposed mix. Laboratory test results of at least six 100 mm x 200 mm cylinders at 28 days shall accompany Form 312. The test cylinder concrete shall be sampled from a design mix of a batch size of at least 3.0 cubic meters. The average strength based on test results of the six cylinders shall not be less than 10 MPa above the minimum strength required by the plans.

Any change in mix design or in the source of mix components or admixtures shall require the Engineer's approval. Request for any change shall be submitted to the Engineer at least 90 days prior to the date of scheduled intended use.

3.0 Testing

For the purpose of testing for the required 28 day compressive strength and also for the required compressive strength for the transfer of prestressing load, the Contractor shall furnish, at no cost to the Department, a minimum of nine concrete cylinders made from a sample of concrete placed near the live end of the bed and a minimum of nine concrete cylinders placed near the dead end of the bed. Two cylinders from each end shall be tested to determine release strength. Three cylinders from each end shall be tested to determine acceptance strength. Cylinders shall be made in 100 mm x 200 mm steel molds in accordance with AASHTO T23, except that the cylinders shall be cured in the same manner as the members represented until the strands have

been released. Cylinders shall be placed in clusters at random points along the casting bed. After the strands have been released, cylinders shall be air cured in an approved common area near the testing apparatus for the remainder of the 28 day curing period. Cylinders shall be tested in accordance with AASHTO T22 except that the neoprene caps may be used. Approved apparatus.for testing the transfer strength of the cylinders shall be provided by the Contractor. This apparatus shall be maintained to within 1.0 percent accuracy and shall be calibrated at intervals not to exceed 12 months by an approved testing company at no cost to the Department. The Engineer reserves the right to require verification immediately after a testing machine is relocated and whenever there is a reason to doubt the accuracy of the indicated load, regardless of the time interval since the last verification. If the coefficient of variation of the 28 day cylinders exceeds 15 percent, the Engineer may require additional tests.

Additional concrete shall be dedicated to the production of forty 100 mm x 200 mm cylinders, six 76 mm x 76 mm x 286 mm prisms, and three 150 mm x 150 mm x 508 mm prisms for each of the eight instrumented girders. The Department will provide all molds and labor required for the production of these specimens. A portion of these cylinders will be match-cured, and the Department will provide for the instrumentation, equipment, operation, and data collection for the match-cured specimens.

4.0 Temperature

The Contractor shall construct a mock-up of the member with thermocouples to monitor temperatures. If the temperature of the mock-up concrete exceeds 85 degrees C, the Engineer may require cores to evaluate the strength of the concrete. Use of the 1.5 meter test girders for monitoring temperatures will not be permitted.

5.0 Mixing

If truck mixing is used, trucks shall be loaded to within at least 0.765 m3 of rated capacity, and concrete shall be mixed at a speed of 16-18 revolutions per minute.

6.0 Payment

No separate payment will be made for high strength concrete. The cost of furnishing and incorporating the high strength concrete, including the cost of additional concrete for the cylinders and prisms, is considered a part of the work of fabricating and furnishing the prestressed concrete units.

ACCESS FOR INSTRUMENTATION (SPECIAL)

1.0 General

The Contractor shall provide Department Personnel with access to the north bound structure for the purpose of installing instrumentation and monitoring equipment in the bridge deck, bent diaphragm, test panels, prestressed concrete girders, and 1.5 meter test girders.

2.0 Bridge Deck, Test Panels, and Bent Diaphragm

The Contractor shall notify the Engineer at least thirty days prior to initiation of each bridge deck pour of the northbound structure or simultaneous test panel pour to accommodate instrumentation. Prior to pouring concrete, and following the completion of the tying of the bridge deck reinforcing steel, a maximum of two days shall be made available to Department Personnel for instrumentation purposes.

3.0 Girders

A total of eight prestressed concrete girders will be instrumented, including one interior girder and one 1.5 meter test girder from each span of the north bound structure. Measurements will be made during the production of these eight girders. All instrumentation and data collection will be made by the Department. For the purpose of installation of equipment, a maximum of one day per instrumented girder will be required. least thirty days prior to the scheduled casting of each instrumented girder, the Contractor shall notify the Engineer. For instrumentation and data collection purposes, the Contractor shall provide Department personnel with access to each instrumented girder as required before, during, and following casting.

REINFORCED CONCRETE DECK SLAB @ STA. 80+30.50 -L-: (SPECIAL)

1.0 General

This special provision shall govern materials, forming and all other related work in the construction of a reinforced concrete deck slab and test panels in accordance with applicable parts of the Standard Specifications, the details shown on the plans, and as outlined in these special provisions.

2.0 Materials

All cast-in-place concrete shall be Class "AA" conforming to the requirements of Section 1000 of the Standard Specifications, except that all concrete for the reinforced bridge deck and test panels shall develop a minimum compressive strength of 41.3 MPa at the age of 28 days and Class F fly ash shall be substituted for 20% of the portland cement in accordance with Article 1024-1 of the Standard Specifications.

3.0 Construction Methods

The slab overhang from the exterior girder to the outside edge of superstructure shall be constructed using removable forms.

No profile grade-line adjustment will be allowed unless permitted by the Engineer.

Curing methods for the concrete, including test panels, will conform to the Standard Specifications except as follows:

The Membrane Curing Compound Method will not be allowed. A curing medium consisting of burlap under polyethylene sheets or another material consisted on the deck and test panels and approved by the Engineer shall be place kept moist for a minimum of seven (7) curing days. The burlap or other approved curing medium shall be wet when placed on the deck. Water shall be applied to the curing medium through soaker hoses or another method approved by the Engineer. Water shall be applied in amounts to keep the medium moist but will not be allowed to flow or pond on the deck.

4.0 Measurement

Reinforced concrete deck slab(s) constructed under this item will be measured by the square meter of horizontal surface area using the nominal dimensions and configuration shown in the Layout Sketch for computing surface area as shown on the plans, transverse measurement being made out to out of slab including raised median and/or sidewalk sections. Concrete Barrier Rail will be measured in accordance with the item under which it is furnished and will not be a part of this item.

The quantities of concrete and reinforcing steel shown on the plans include test panels, concrete diaphragms, end posts, sidewalks, and other required attachments based on the profile grade and plan camber of girders. The quantities also include the 25 mm additional concrete due to the corrugation of the metal forms and based on the profile grade and plan camber of the girders.

No measurement will be made for concrete or reinforcing steel due to a variation in camber of the girders from the plan camber.

5.0 Payment

The quantity for which payment is made will be that quantity shown in squares meters on the plans. Where the plans have been revised, the quantity to be paid for will be the quantity shown on the revised plans.

The unit bid per square meter will be full compensation for all work covered by this special provision and applicable parts of the Standard Specifications but not limited to furnishing and placing concrete, reinforcing steel, deck drains, and any other material, erecting and removing all falsework and forms, protecting concrete in wind, rain, low humidity, high temperatures or other unfavorable weather, constructing joints, constructing drains, finishing concrete and curing concrete.

Payment will be made under:

Reinforced Concrete Deck Slab @ Sta._____……..... Square meter